



About 2,000 people visited last week's Information Services Division computer exposition. Photo on Page 4.



JSC Deputy Director Paul J. Weitz opens a Direct Line for energy conservation suggestions. Story on Page 4.

Space News Roundup

Vol. 29

June 8, 1990

No. 23

Columbia to roll back from launch pad

Orbiter, external tank must be demated for repairs; STS-38 to launch first

By Kyle Herring

The Space Shuttle *Columbia* will be rolled off the launch pad and back to the Vehicle Assembly Building (VAB) after a tanking test Wednesday confirmed a leak in the 17-inch disconnect area between the orbiter and external tank.

The decision to roll back means that STS-38 and its dedicated Department of Defense mission will be launched first in mid-July.

"I feel very good in that we have found the problem and can go fix it and deal with the manifest in an orderly fashion," Space Shuttle Program Director Bob Crippen said Thursday in a briefing at NASA Headquarters.

The leak, which appears only under extremely cold cryogenic conditions, surfaced



STS-35

Astro-1

around the disconnect cavity in order to better isolate the leak.

In analyzing the data after the test, managers

shortly after the tanking test began when liquid hydrogen began pumping through the orbiter into the external tank. About 20 sensors had been placed in strategic locations

decided to roll *Columbia* all the way back to the Orbiter Processing Facility (OPF) for repairs.

"Unfortunately, we don't like what we found," Launch Director Bob Sieck said. "In order to fix anything in this area, we're going to have to demate the orbiter from the tank."

The launch of the STS-35 ASTRO-1 mission is on hold until the repair is made. Please see **COLUMBIA**, Page 4

Report due in July

Spacewalk study team gains ground

By Kelly Humphries

The JSC team working to enumerate the maintenance needs of Space Station *Freedom* will reconvene this month to review its progress and that of an independent study group asked to check its findings.

The team, co-chaired by Engineering's Charles Price and Astronaut Bill Fisher, is conducting a "bottoms up" study of the amount of extravehicular activity, or spacewalks, needed to support the station over its planned 30-year lifetime.

The "Fisher-Price Team," as it has come to be known, is expected to present the completed report to Space Station Program Office and agency management in July.

Fisher said that during an April midterm review, 80 to 100 representatives from all of the space station work packages, contractors and international partners met to discuss what has been learned so far and to reiterate the high priority the program places on the study.

A splinter group headed by SAIC was chartered to evaluate independently the failure rates of each of the nearly 6,000 external orbital replacement units (ORU) that will be used on the space station, Fisher said. An ORU is any item or device outside the space station modules that may need to be replaced, such as pumps, wiring, radiators, thermal blankets and electronic "boxes."

With complete access to all ORU information, the SAIC group will estimate how many failures can be expected on a yearly basis, what types of failures will occur and the effect of "shakedown failures" and long-term wear out.

The failure rate information will form a significant component of the final estimate of the amount of

Please see **SPACE**, Page 4



NASA File Photo

SILVER SPACEWALK—Twenty-five years ago this week, Astronaut Edward H. White II made the first American spacewalk and "Houston" was used as a space flight call sign for the first time. The Gemini IV mission marked the first use of the Mission Control Center at what was then the Manned Spacecraft Center. A historical photo essay is presented on Page 3.

Payload bay door 'flexes' in mishap

An investigation board will examine the circumstances of a Monday mishap in which one of the Space Shuttle *Discovery's* payload bay doors was raised improperly by about 10 inches.

Kennedy Space Center inspectors said there were no initial indications of visible damage, but that they were continuing to look for any hidden damage using boroscope X-ray cameras. Investigators from the Tulsa Division of Rockwell International, manufacturer of the graphite-epoxy door, have been asked to inspect the door as well.

Workers preparing *Discovery* for its October STS-41 mission to launch the Ulysses solar polar orbiter improperly moved the overhead bridge, or crane, while it was attached to the zero-G fixtures used to close the doors on Earth. The door, which had been configured for closure, flexed briefly before the workers corrected the problem.

The accident occurred about 8:30 a.m. EDT in Orbiter Processing Facility high bay 1.

KSC Director Forrest McCartney named Paul Myers, technical assistant to KSC's director of engineering development, to chair the investigation board.

The board will investigate the facts surrounding the mishap, determine its probable cause, assess the possibility of a recurrence and recommend corrective actions by mid-July.

As the manifest now stands, *Discovery's* launch is still scheduled for Oct. 5.

Hawley new associate director at Ames

By Jeff Carr

Three-time shuttle flight veteran Steven A. Hawley, Ph.D., will depart the Astronaut Office in July to become associate director (acting) of NASA's Ames Research Center at Moffett Field, Calif.

The appointment as Ames' third-ranking executive under Director Dale Compton becomes effective July 29.

Hawley, who has served as deputy chief of the Astronaut Office since 1987, flew most recently as mission specialist aboard the *Discovery* on STS-31 in April. During that flight, he

successfully delivered the Hubble Space Telescope to orbit using *Discovery's* robot arm and extended his total time in space to more than 412 hours.

The 38-year-old Kansas native will be returning to the San Francisco bay area, where he earned his doctorate in astronomy and astrophysics from the University of California, Santa Cruz, in 1977.

"It was a very difficult decision to leave JSC," Hawley said. "The nature of the job we do and the quality of the people we work with is without

equal. However, at this point in my career, the Ames position is a unique opportunity to apply some of my knowledge and experience to a different part of what NASA does.

"I am looking forward to the new challenge and the career options that may result. Eileen and I will miss all of our friends here at JSC."

Selected as an astronaut in 1978, Hawley worked as a simulator pilot in the shuttle software laboratory and on astronaut support crews for STS-2, STS-3, and STS-4 before making

Please see **HAWLEY**, Page 4



Steve Hawley

Voyager's photo finish puts solar system in perspective

Voyager scientists released a "family portrait" of the solar system Wednesday, putting into perspective the relative sizes and distances of the planets and the fragile nature of Earth.

The photo mosaic was taken in February by Voyager I, which left the solar system's ecliptic plane after passing near Saturn's largest moon Titan and its extensive ring system. The 39 wide angle and 21 close-up images were snapped from a position 32 degrees above the ecliptic plane and some 3.7 billion miles from Earth.

No other spacecraft has ever been in a position to attempt a similar series of photographs, said Dr. Edward C. Stone, project scientist for what is now

called the Voyager Interstellar Mission. Since current planetary probes are intended to go into orbit around their targets, no more such photos are expected for decades, he added.

Both Voyager I, launched Aug. 20, 1977, and Voyager II, launched Sept. 5, 1977, are continuing outward, searching for the heliopause, or boundary between the Sun's influence and interstellar space.

"It's been a wonderful journey, and I'd start it again if I had the chance," Stone said. "There's still exploration left to do, but it's clear the major part of the mission is now over."

The Sun, Neptune, Uranus, Saturn, Jupiter, Earth and Venus showed up

as small dots on the photographs, but Mars was obscured by scattered light in the camera lens. The Earth, somewhat obscured, showed a faint blue tint.

"On that blue dot, that's where everyone you know, everyone you ever heard of and every human being who ever lived lived out their lives—a very small stage in a great cosmic arena," said noted astronomer Dr. Carl Sagan. "I think this perspective underscores our responsibility to preserve and cherish that blue dot, the only home we have."

Stone retraced the steps of the two spacecraft as they explored all of the giant outer planets of the solar system,

their unique ring systems and magnetic fields, and 48 of their moons.

The two spacecraft virtually rewrote the book on planetary astronomy, but Stone said some of the more interesting discoveries included:

- On Jupiter, a better understanding of its turbulent atmosphere and the hurricane-like Great Red Spot that appears to be a product of opposing jet streams;

- On Jupiter's moon Io, active volcanism that doubles the size of the jovian magnetosphere and forms a doughnut-shaped cloud of ions that glow in the ultraviolet;

- On Saturn, broad atmospheric banding similar to, but much fainter

than, that found on Jupiter, and "shepherd" moons on either side of at least one ring;

- At Uranus, 10 new moons and a magnetic field tail twisted by the planet's rotation into a long corkscrew shape behind the planet;

- At Neptune, several large dark spots similar to Jupiter's—one dubbed the Great Dark Spot—and a tilted magnetic field that hints at similar interior composition of Uranus and Neptune; and

- On Neptune's moon Triton, active geyser-like eruptions of nitrogen gas and dust particles on the coldest known planetary surface at minus 391 degrees Fahrenheit.

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m. to 2 p.m. weekdays.

General Cinema (valid for one year): \$3.75 each.

AMC Theater (valid until May 1991): \$3.50 each.

Sea World (San Antonio, year long): adults, \$17.25, (2-day, \$21.95); children (3-11) \$14.75, (2-day, \$18.95).

Astroworld (valid 1990 season): season, \$39.95; regular, \$15.97; children, \$9.21; Waterworld, \$8.15; 2 day—AW/WW, \$18.47.

Variety dance (7 p.m.-1 a.m. June 15, includes dinner): \$15 per person.

FBA Scholarship applications are available in Bldg. 1, Rm. 840 and Bldg. 11 store for members of the FBA.

JSC

Gilruth Center News

Sign up policy—All classes and athletic activities are first come, first served. To enroll, you must sign up in person at the Gilruth Recreation Center and show a badge or EAA membership card. Payment must be made in full at the time of registration. Classes tend to fill up four weeks in advance. No sign ups are taken by phone. Payment by exact change or check.

EAA badges—Dependents and spouses may apply for a photo I.D. 6:30 p.m.-9:30 p.m. Monday-Friday.

Defensive driving—Course is offered from 8 a.m.-5 p.m. July 21 and Aug. 18; cost is \$15.

Weight safety—Required course for those wishing to use the Rec Center weight room. The next classes will be from 8-9:30 p.m. June 21; cost is \$4.

Aerobics and exercise—Both classes are ongoing. Sign up at the Rec Center.

Country and Western dance—Lessons began June 4. This course will be held every Monday for 6 weeks, cost is \$20 per couple.

Summer softball sign-ups—Sign-ups will be held the week of June 19 at the Rec Center.

Men's Open "C" Softball Tournament—The tournament will be June 30. The entry fee is \$95, limited to 16 teams, and is due June 28 by 6 p.m.

Ballroom Dance—Classes begin Aug. 2 and meet every Thursday for 8 weeks. Beginning and advanced classes meet 7-8:15 p.m. Intermediate class meets 8:15-9:30 p.m. Cost is \$60 per couple.

New way to start your day!

The JSC Employee Information Service now is updating its reports at 8:30 every morning.

For the latest information on what's happening at JSC, from seminars to crew return ceremonies, the JSC Employee Information Service has what you're looking for.

The recorded announcement can be reached by calling:

483-6765

JSC

JSC

Dates & Data

Today

Technical society banquet—The Clear Lake Council of Technical Societies will hold an awards banquet at 6:30 p.m. June 8 in the Gilruth Recreation Center. For more information, call Andy Lindberg, x31474. For reservations call Marcia, x30195.

JSC Astronomical Society—The JSC Astronomical Society will receive "Reports from the Texas Star Party" at 7:30 p.m. June 8 at the Lunar and Planetary Institute. For more information, call Bill Williams at 339-1367.

Cafeteria menu—Special: tuna and salmon croquette. Entrees: pork chop with yam rosette, Creole baked cod. Soup: seafood gumbo. Vegetables: Brussels sprouts, green beans, buttered corn, whipped potatoes.

Monday

SACM/SIGGRAPH meets—The Houston Area Association for Computing Machinery/Special Interest Group in Computer Graphics (ACM/SIGGRAPH) will meet at 5 p.m. June 11 at McDonnell Douglas Space Systems Co., 1300 Bay Area Blvd. Brad Bell of Barrios will discuss ray tracing algorithms. For more information, call Frank Taylor, 283-1278.

Cafeteria menu—Special: Italian outlet. Entrees: braised beef ribs, chicken a la king, enchiladas with chili. Soup: cream of broccoli. Vegetables: navy beans, Brussels sprouts, whipped potatoes.

Tuesday

JSC Astronomy Seminar—Dr. J. Firor will discuss "Probability of Climate Change" from noon-1 p.m. June 12 in Bldg. 31, Rm. 129. For more information, call Al Jackson, x33709.

Cafeteria menu—Special: stuffed cabbage. Entrees: turkey and dressing, round steak with hash browns.

Soup: beef and barley. Vegetables: corn cobbette, okra and tomatoes, French beans.

Wednesday

Threshold Group meeting—A committee meeting will be held 11:30 a.m.-12:30 p.m. June 13 in Bldg. 4, Rm. 3002. For more information, contact James Sturm at x33085.

PSI meeting—Professional Secretaries International (PSI) will meet at 6 p.m. June 13 at the Holiday Inn on NASA Road 1. Barbara Wolfer will speak on "Self-Improvement Tips and Tools." Contact Cindy Thomasen, x30228, for reservations. For further information call Pat Woolcock, 754-2570.

SCS meets—The Houston Chapter of the Society for Computer Simulation will meet at 11:45 a.m. June 13 at Fuddrucker's on NASA Road 1. For more information, call Wade Webster at 486-6450, or Robin Kirkham at 333-7345.

Cafeteria menu—Special: pepper steak. Entrees: catfish with hush puppies, roast pork with dressing. Soup: seafood gumbo. Vegetables: broccoli, macaroni and cheese, stewed tomatoes.

Thursday

AIAA banquet—The American Institute of Aeronautics and Astronautics (AIAA) will hold its annual Honors and Awards Banquet at 6:30 p.m. June 14 in the Rec Center. Reservations deadline is noon June 11. For dinner reservations call Sarah Leggio, 282-3160. For more information contact Andy Sylvester, x31545.

AFGE meets—The American Federation of Government Employees (AFGE) will meet at 5:15 p.m. June 14 at the Rec Center. For more information, call Mary McLain at x34277.

Solar System seminar—The Solar System Exploration Division Seminar Series will continue at 3:30 p.m. June

14 in Bldg. 31, Rm. 129. David Mittlefehldt will speak on "Diogenite Meteorites: Geochemistry, Petrology, Genesis." For more information, call Nadine Barlow, x35044.

Cafeteria menu—Special: chicken fried steak. Entrees: beef tacos, barbecue ham steak, Hungarian goulash. Soup: turkey and vegetable. Vegetables: spinach, pinto beans, beets.

June 15

Space society meets—The Houston Space Society will discuss "Industrial Pollution, Space Solutions" at 7:30 p.m. June 15 in the Atlantic Room, University of Houston. Bill Agosto, President of Lunar Industries Inc., will speak. For more information call 639-4221.

MPAD wake and reunion—The Mission Planning and Analysis Division (MPAD) plans a wake and reunion (W&R) for the now-defunct branch. All former civil service MPAD-ers are invited to the 4-8 p.m. June 15 event at the Rec Center Pavilion. For more information, call Gloria Martinez at x38091.

Cafeteria menu—Special: tuna and noodle casserole. Entrees: liver and onions, deviled crabs, roast beef with dressing. Soup: seafood gumbo. Vegetables: whipped potatoes, peas, cauliflower.

June 20

JSC Astronomy Seminar—The seminar will be an open discussion meeting from noon-1 p.m. June 20 in Bldg. 31, Rm. 129. For more information contact Al Jackson at x33709.

June 26

BAPCO meeting—The Bay Area PC Organization will meet at 7:30 p.m. June 26 at the League City Bank & Trust. For more information call Earl Rubenstein, x34807, or Tom Kelly, 996-5019.

Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2.

Property

Lease: 1-1.5 condo, new carpet, tile, appli., fans, 2 patios, pools, wt. rm., sauna, sec. sys., cov. pkgng, near NASA, \$500/mo. 486-4016.

Rent: 2-2.5-2 twnhse., new paint/carpet, FPL, LR mirr., appli., patio/stor., \$750/mo. 488-2664.

Lease: Egret Bay condo, 2-2-2CP, appli., new carpet/paint, \$525/mo. plus dep. Irene, x39043 or 480-9812.

Sale: Nassau Bay, 4-2-2, formal, Florida rm., spa, deck, close to JSC. Anne, 282-4907 or 335-1482 or Mike, 283-7306.

Sale: Lake Livingston, waterwood, 2-1, 2-story on 1/4 acre, dbl. CP, CA/H, stor. Robert Kline, 870-0090.

Sale/Trade: Lake Livingston lot at Holiday Shores, util. on lot, comm. pool, tennis, rec center, \$6,900 or same value property in Bay area. Cecil, 488-0719.

Sale: Friendswood, 3-2-2, lg. lot w/Gunite pool, 2,000 sq. ft., new paint/carpet, fans, \$88,500. 483-4902 or 996-9128.

Trade: 4-3, W. of Austin, prefer 5-yr.-old open plan w/in 20 min. of JSC. 471-8795 or 333-6083.

Lease: Piper's Meadow, near JSC, 3-2-2, ten., FPL, fans, good cond., 1-yr. lease, \$700/mo. plus dep. Susan, 488-9020 or 480-6446.

Sale: Mobile home, 2-2 on 80x120 lot, appli., stor., patio/sidewalks. 337-1365.

Lease: 1 BR condo, CLC, FPL, W/D conn., appli., micro, fans, tennis, wt. rm., clean, avail June 1. Jim Briley, 488-7901.

Rent: Heritage Pk., 3-2-2, 7 yrs. old, W/D, fans, \$725/mo. 482-7814.

Sale/Lease: Baywind II condo, 2-2-2, new carpet/miniblinds/paint, near NASA, FPL, wet bar, W/D, tennis, pools, \$525/mo. 280-8796.

Rent: Meadowgreen, 4-2-5-2, 2,319 sq. ft., cathedral ceiling, fan, micro, FPL, fence, gas grill, \$1,150/mo. 480-4160.

Rent: Lake Travis cabin, priv. boat dock, CA/H, accomm. 8, \$425/wkly., \$85/dly. 326-5652.

Sale: Big Bend, 160 acres, hunting, \$120/acre, CFD 15% down, 9% for 8 yrs. 337-4051.

Sale: 2-2 furn. condo, sleeps 6, pool, hot tub, steam wt. rm., 45 min. from JSC, \$12K. Steve, x38204.

Lease: Sagemeadow, 4-2-2, FPL, formal DR, priv. cryd., avail. after June 29, \$725/mo. plus dep. 480-0667.

Sale: Waterview lots near NASA, mid 30's. Don, x38039 or 333-3313.

Sale: Camino So., 3-2-2, hwd. flrs., new carpet, corner lot/trees, near RSOC, 9.5% FHA assum., \$79,900. Brian, x37070 or 280-8500.

Knoll, avail. Aug. 1. Lydia, x37031 or 480-6753. Sale: Dickinson, 3-2-2, lg. LR, kit, MB, x38078 or 534-2761.

Sale: Nassau Bay, 3-2-2, by owner, pool, trees, formal, FPL, 621-7201 or 333-2307.

'83 Nissan PU, standard sport, black, well maint., AM/FM, air, orig. owner, sunroof, \$2,800, Pete, 480-8190.

'81 Ford Fairmont, pwr., good cond., \$1,500, OBO. 333-5430.

'88 Volvo 740 turbo, current NASA book value. Phil, 282-3600.

'89 Ford Festiva, \$1K and take up pmts. Paula, x35230 or 337-1037.

'88 Ranger, 5-spd., bedliner, good cond., \$4,600. 283-4104 or 332-7881.

'80 Toyota, 5-spd., good cond., \$800. 283-4104 or 332-7881.

'88 Subaru sedan, 5-spd., ex. cond., 30K mi., \$8,000. 486-0179.

'80 GMC Van Rally STX, 8 passenger, loaded, x33656 or 486-8276.

'84 Nissan 200SX Turbo, 5-spd., htchbck., 49K mi., \$5,500. 538-3150.

'72 Ford F-100 1/2 ton PU, w/camper shell, 3-spd., good cond., \$1,200. Randy, x36563 or 486-8485.

'82 Porsche 924, ex. cond., 62K mi., 5-spd., \$6,750, OBO. 280-8796.

'76 Ford Granada, 4-dr., V8, 3-spd., good cond., \$1,000. 474-4303.

'85 Mallard motor home, loaded, low mi., \$36K. 337-4051.

'83 Chev. Malibu, 4-dr., auto., high mi., good cond., \$1,500. Chris, x32819 or 280-8330.

'71 Triumph Spitfire Mark IV, new top/carpet/tires/batt./alternator/starter, \$3,200. Clay, 282-4005 or 880-2327.

'69 Camaro 307, auto., morphology-9, physiology-2, \$1,200. Clay, 282-4005 or 880-2327.

'83 Parting Out Honda Accord, 4-dr., 175cc eng., 5-spd. 554-3622.

'79 Blazer K-5 lift kit, 39" tires, ex. cond., \$2,700. 282-3825 or 486-4337.

'85 Buick Electra Pk. Ave., 4-dr., all pwr., ex. cond., 66K mi., \$6,700. 482-1535.

'84 Honda Civic DX, 3-dr. htchbck., ex. cond., \$3,500. x31894.

'77 24' Nomad travel trailer, w/qualizer hitch, \$3K. 334-1883.

'65 Olds Starfire Sport Coupe, 106K mi., \$2,500, OBO. Tom, x38298 or 488-4089.

Cycles

20" Diamondback bike, ex. cond., \$85. Jeane, 488-3235.

'80 CB 750 Custom Honda, good cond., \$850, OBO. x34270 or 337-1896.

'83 Suzuki GS 1100E, low mi., new tires, ex. cond., \$2K nego. Matt, 554-7372.

'82 Yamaha 650cc Maxim, 5K mi., ex. cond., \$1,100. 482-8488 or 482-8820.

'86 Husqvarna WR-400, ex. cond., \$795. Steve, 944-6513 or Joe, 333-7357.

'87 Honda Hurricane 600, 10K mi., new dunlops/cov./lock/helmet, \$2,700. Joe, x34538.

Boats & Planes

16' Hobie Cat Catamaran, Corumba sails, dbl. trapeze, \$1,800 nego. Matt, 554-7372.

'78 22' MacGregor sailboat, 3 sails, 7.5hp OB, trlr., \$4K, OBO. 332-7167.

19' Flying Scot sailboat, trlr., spinnaker, holds 8, \$2,850. Phil, 282-3600.

Aircraft propeller, Sensenich 74DM6-0-58, fits some Beech, Piper PA-18, PA-22, PA-26 series aircraft, \$900,

Audiovisual & Computers

Boston acoustics 5 1/4 car spkrs., \$37.50/pr.; Technics 9 band equalizer, \$49.50. 527-9070.

IBM PS/2 model 50 w/VGA color, coprocessor, 3 1/2" and 5 1/4" drives, mouse, 24 pin printer, SW, desk chair, \$2,800, OBO. 554-2955.

PC-AT 80286 12.5 MHz, EGA graphics, 3.5 and 5.25 high den. floppies plus 40 MEG fixed disk, 1 MEG of RAM, \$1,250. x31367 or 996-1410.

Apple IIc, monitor, Imagemaster II printer, SW, exp. RAM, joystick, \$700 nego. 480-2998.

Apple IIc, Amdek color monitor, Panasonic 1041 printer, joystick, desk, \$1K, OBO. Matt, 332-8288.

Macintosh 512, 2 MEG elec. RAM, carrying case, SW, \$700, OBO. 523-7200.

Panasonic XT port, dbl. 360K floppy drive, thermal printer, 512K mem., w/20 MEG ext. HD, \$600. Bill Shurleiff, 482-8494.

IBM PC XT w/monitor, HD, keybd., \$875 or w/INTEL inboard 386 comp. (1 MEG) installed \$1,250/both, 483-0092 or 481-3637.

Elmo ST-180 reg. 8mm Telecine projector, var. speed, 5 blade shutter for film to video synch./conversion, ex. cond., \$300. x31945 or 482-5948.

Cutting edge, 800K 3.5" external floppy drive for Macintosh, \$75. x31945 or 482-5948.

Sansui rec., \$50; Kodak Carousel 750H slide projector, \$50. Jim, x39421 or 484-4926.

Compaq DeskPro, color, 640K, 20MB, dual 360K floppies, \$900. 486-8659.

Household

Crews Quarters BR set, 2 single beds, chest, pine, \$125. Jeane, 488-3235.

DR table, glass top, brass base, 6 cane-backed chairs w/uphol. seats, ex. cond., \$200, OBO. Anne, x34493 or 996-1287.

5-pc. DR set, ex. cond., white top w/mauve cushion seats, \$150. Paula, x35230 or 337-1037.

Kenmore side-by-side refrig., ice maker, ice/water outside, 22 cu. ft., \$450. 282-3963 or 488-8805.

25" RCA rem. control TV, base floor model, \$400. 486-0179.

Couch/love seat, brn. w/gold accents, ex. cond., \$200. 334-2699.

Sleeper chair, good cond., \$100, OBO; overstuffed chair, useable cond., \$25, OBO. Glenn, x38673.

19" Emerson color TV, no rem., ex. cond., \$100, OBO. Beth, x37081.

Queen sz. wtrdb., bkcs.-mirror hdbd., matt. needs repair, \$50, OBO. x38502 or 486-9191.

Antique solid maple dresser w/bev. mirror, \$400, OBO. 283-5496 or 332-1614.

Kenmore side-by-side refrig., green, \$75. Mike, 483-

Musical Instruments

Kimball organ, Swinger 700 series, ex. cond., \$350 nego. Sharon, x34111.

Ovation Legend guitar, acoustic, 6-string steel, case, ex. cond., \$350. 482-9172.

Grand piano, polish ebony, 8 1/2 mos. old, 10 yr. full warr., will pay for delivery, \$6,200 nego. Joe, 483-3477 or 946-8198.

Lost & Found

Lost: Ladies white linen hanky w/lace edging, 5-18-90 between Bldg. 2 and D St. parking lot. Billie, x38646.

Lost: Gold hoop earring between Bldg. 2 & 8 during STS-31, tri hoop w/twisted rope design. Lida, x38603 or 486-9620.

Photographic

PENTAX K1000 35mm camera w/wide angle & zoom lens, auto./comp. elec. flash, case, ex. cond., \$150, OBO. Oma, x30367.

Pets & Livestock

App. mrs. 8 yrs. old, ext. gentle, \$1,500. x33224 or (409) 986-6641.

Shelly pups, AKC, born 4-24-90, \$200. Bob, x34409 or 393-1670.

Domestic hand-raised Scarlet Macaws, Congo African Greys, Yellow Nape Amazons, Green Wing Macaws. Nancy, 337-2974.

Free, 5 mo. old pup, gentle. 482-5393.

Yorkshire Terrier, 1 yr. old, AKC reg., \$150 nego. 280-0017.

Zebra Finches, white w/brn. doves, guinea pigs, \$5/ea. Jim, 282-3750 or 482-6744.

AKC Cocker Spaniel fem. pup, 12 wks. old, \$75. Tamela, x36159 or 472-6323 or Tannya, 479-0297.

Min. Schnauzer pups, AKC, ears cropped, 2 F, 4 M, 2 mos. old, \$225/ea. Tamela, x36159 or 472-6323 or Tannya, 479-0297.

Wanted

Non smoking fem. to share house in CL, \$300 plus 1/3 util. Sharon, 486-4016.

Lg. Mission Control patch; Marty Robbins rec. of El Paso to borrow.



Twenty-five years ago, 'Houston' went to space

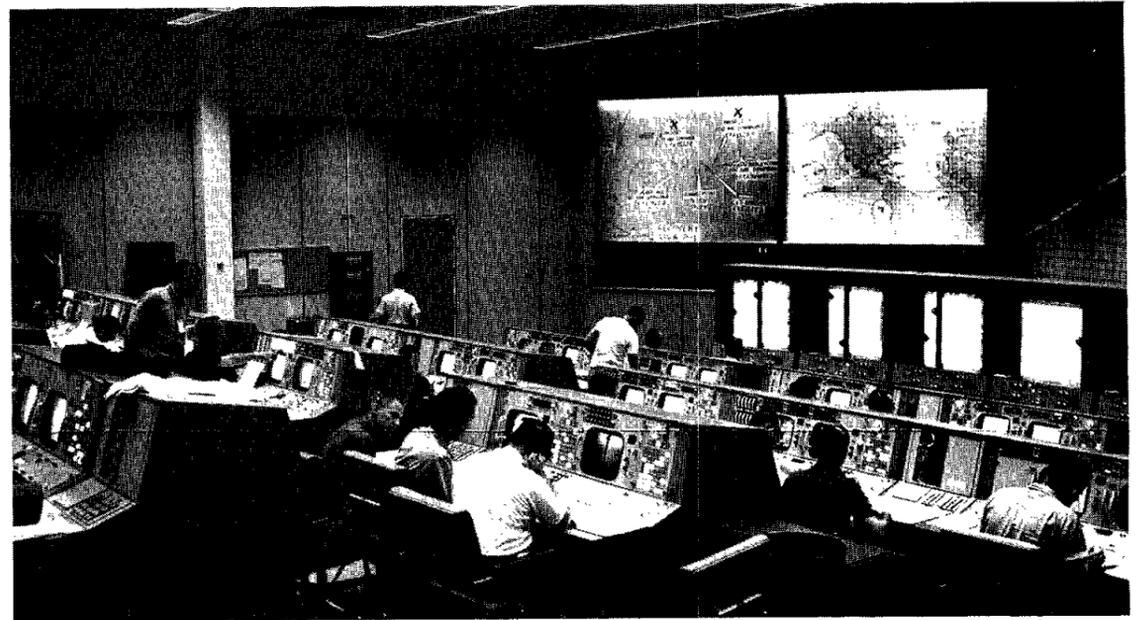
As spring gave way to summer 25 years ago, two of Houston's most famous landmarks were opening for business. The first to open was the Astrodome, whose April fanfares heralded the arrival of the "Eighth Wonder of the World." Two months later, the new Mission Control Center began its operational life with the flight of Gemini IV in early June 1965. It was to be the longest mission to date in the American program, the first to include a spacewalk and a battery of carefully integrated science experiments, and the first to require around-the-clock, three-shift operations in the control center.

Above, the flight directors for Gemini IV—Gene Kranz, Glynn Lunney, John Hodge and Chris Kraft—gather for a team photo, while other pre-flight activities included (above right) water egress training at Ellington Air Force Base for Command Pilot Jim McDivitt (left) and Pilot Ed White, and spacewalk training for White on an air bearing table—then located in Bldg. 4.

Meanwhile, the new control center was for the first time the focal point for flight controller training. At right, Kraft and Hodge conduct a reentry sim. Note the analog trajectory plot-

ters—used by the flight dynamics and retro officers—at the front of the room. The passage of a quarter century highlights other changes that have taken place since Gemini IV. Below, astronaut John Young and Deke Slayton, then the assistant director for Flight Crew Operations, enjoy a cigar on June 6, the day before the flight ended. Although countless stogies were burned in the room in later years, none have been fired up since the landing of STS-26 and the advent of JSC's no-smoking policies.

Other scenes from the milestone mission—the first to draw more than 1,000 news people to Houston—include, at right, a post-flight reunion of the McDivitt family at Ellington, congratulations by then Manned Spacecraft Center Director Robert Gilruth, an excited Pat White talking to her husband after his spacewalk on June 3, a visit by President Johnson on June 11, and a view of the vast crowd that gathered to hear the President's address in front of Bldg. 30. After the ceremonies in Houston, the crew was off for a ticker tape parade in Chicago and a visit to the Paris Air Show, where they met Cosmonaut Yuri Gagarin, the world's first space traveler.



MSC Photos by Andrew "Pat" Patnesky

JSC participating in JOVE summer research program

By Pam Alloway

Participants in a summer educational project new to JSC this year hope work begun at NASA centers will spark long-term interest in space research at small university campuses.

The project is known as JOint VEnture, or JOVE, and its participants are enthusiastic about the project's short-term and long-term implications.

"The point of the JOVE program is to give faculty members at small universities who generally don't get the chance to do a great deal of research the opportunity to do so, and to support them and their students in that

research," said JSC's Dr. Wendell Mendell, who will sponsor one faculty member this summer. "JOVE is designed to try and plant a seed that can grow within the university."

NASA and the universities jointly fund a 10-week summer resident research session for faculty members at a NASA center. The visitor, who must work on research of interest to NASA, is matched with a NASA sponsor or colleague. The pilot program began last year at Marshall Space Flight Center. This year JSC and Goddard Space Flight Center also are participating.

Dr. Stanley Goldstein, JSC Director

of University Programs, said JOVE began as a means to help analyze the large amounts of data NASA has received from various satellites, but its purpose soon broadened. Plans call for the participation of additional universities and NASA centers.

"This program fits into NASA's educational goals by involving smaller schools in space education and providing one way of meeting the needs involving space related research activities," Goldstein said.

Mendell, JSC's chief scientist for lunar base studies, will work with Dr. Paul Morgan from Northern Arizona University—Flagstaff. Morgan earned

his doctorate in planetary geophysics and is the chairman of the university's geology department. Prior to his association with Northern Arizona University, Morgan worked at the Lunar and Planetary Institute and is familiar with NASA's lunar sample program, Mendell said.

Morgan will review whatever information NASA has on the properties of the upper five to 10 meters of the lunar surface. His research will assist other scientists in their plans for mining and construction on the lunar surface.

"We need is to identify geotechnical properties that will be important for civil engineering applications such as

construction and mining," Mendell said. Morgan also will identify data needed from precursor missions to the Moon. He will begin his work at JSC at the end of June.

Dr. Ernest Boyd, a mathematics professor from Mankato State University in Mankato, Minn., will work with JSC's Dr. Steve Gonda, chief scientist in the biotechnology program.

Boyd's project will involve the mathematical modeling of culture systems within JSC's bioreactor. The biotechnology program is focused on the development of microgravity-based cell culture techniques and approaches.

DIRECT LINE



By Paul J. Weitz

Energy saving ideas adopted

(Editor's note: In this, Deputy Director Paul J. Weitz's first Direct Line column, he addresses two energy conservation suggestions submitted by employees.)

Q: Why don't we try to keep costs down by turning the lights off in the Bldg. 1 parking lot? At a minimum, we could stop lighting all four lights on every pole. In the Bldg. 5 parking lot, only one light per pole is on. This building has workers who leave at all times, unlike Bldg. 1.

A: This is a good idea, but it must be balanced with security needs and overall management of our scarce research and program management (R&PM) dollars.

When saving money is our primary goal, the cost of performing tasks has to be taken into account when making energy conservation modifications or enhancements. It costs approximately \$100 an hour for two men and a bucket truck to disconnect circuits at the lamps. By the time each fixture is disassembled and reassembled, about \$20 per lamp is consumed. A 300-watt bulb will burn for more than 1,500 hours for that same \$20. Therefore, we plan to implement your suggestion slowly. After all of the lamps on each pole fail, the light will be serviced and only one lamp will be replaced.

Q: The panels below the building windows were originally hollow between the black outside glass and the inside wall. In the old days, you could burn your hand on the inside room panel when the sun was shining on the panel exterior. Since that time, many of the panels have been removed and Fiberglas insulation has been installed. Can we verify that all of these wall cavities have been insulated? If it is too much trouble to remove the inner panel and install Fiberglas, could we develop a procedure to inject polyurethane foam into the cavity?

A: This is another good idea. We did use various methods to add insulation in the '70s. Their existence in all cases would be difficult to verify by records today. However, this summer when the temperature differentials are higher, we'll make a survey with an infrared heat detector to ensure that insulation exists between inner and outer window panels. Those that have not been insulated will be.

Hawley goes to Ames

(Continued from Page 1)

his first space flight. He first flew as a mission specialist on the maiden voyage of *Discovery*, STS-41D, in August 1984, deploying three communications satellites and activating the OAST-1 solar cell wing experiment.

He made his second trip to orbit aboard *Columbia* on STS-61C in January 1986, helping deploy the SATCOM KU satellite and conduct experiments in astrophysics and materials processing.



JSC Photo by Jack Jacob
EXPO EDUCATORS—Information Systems Directorate workers (from left) Donn Sickorez, Dianne Robinson and Scott Patterson explained ISD's end user computing services at the recent Computer Expo '90. Expo coordinator Robinson said more than 2,000 people attended the day-long event that featured displays and demonstrations by more than 40 computer vendors.

NASA Headquarters lease consolidates scattered offices

Scattered NASA Headquarters offices will begin moving into a single leased building beginning in 1992, the U.S. General Service Administration (GSA) announced Monday.

GSA has approved a lease contract for a new NASA Headquarters facility, effectively consolidating offices from three federally owned and three leased buildings into one location.

GSA's National Capital Region awarded the 20-year with a 10-year renewal option lease to the Southwest Market Limited Partnership for its Two Independence Square building. The building will be constructed between Second and Fourth Streets on E Street SW,

about five blocks southeast of the current NASA Headquarters main building.

GSA said the move creates an unprecedented partnership between GSA and NASA resulting in the largest single building consolidation/relocation effort in the District of Columbia. The building will contain approximately 488,000 net usable square feet of office space. The 10-story building will have three levels of parking with more than 700 parking spaces. It will contain about 115,000 square feet of special space for computers, conferences and other uses.

Phased occupancy is scheduled to begin in 1992, with complete occupancy planned for mid-1993.

NASA reverses decision to move Apollo 204 debris

The Apollo spacecraft in which three astronauts were killed during a launch pad fire will not be joining the debris from the Space Shuttle *Challenger* in an abandoned missile silo at Cape Canaveral.

After discussions with members of the astronauts' families, former astronauts and officials at the National Air and Space Museum, NASA reversed

its decision to move the Apollo 204 debris and chose to maintain the material at Langley Research Center.

Astronauts Virgil I. (Gus) Grissom, Roger B. Chaffee and Edward H. White II were killed in a spacecraft fire Jan. 26, 1967, on Launch Pad 34 during prelaunch tests for the first manned Apollo mission.

Until about 10 years ago, the debris

was maintained in a low-pressure nitrogen atmosphere to minimize corrosion. Since then, the container has been deteriorating and several small leaks have developed. Routine repairs have been made, but due to its age the container cannot be effectively maintained.

As a result, NASA officials announced in May that the command

module, heat shield, associated hardware and investigative data would be moved from a hangar at the Langley Research Center to the Florida silo for permanent storage.

The command module, heat shield, booster protective cover and 81 cartons containing hardware and investigation data take up about 3,300 cubic feet.

Space station EVA timelines being simulated at JSC

(Continued from Page 1)
extravehicular activity (EVA) necessary to sustain *Freedom*. The number of spacewalks necessary for maintenance is a concern because of the amount of crew time that will be diverted from research. Program officials are hoping to keep the number of spacewalks down to about one a month as an overall goal. Early estimates put the need at between one and three spacewalks a week.

"They're going to look at this with a clear eye and try to help us," Fisher said.

In addition to defining the extent of the maintenance requirements, the Fisher-Price team also is pursuing how efficiently EVA can be performed, the effectiveness of the Space Station *Freedom* robots performing maintenance and ORU design concepts to support both EVA and robot efficiencies.

An EVA/robot-"friendly" ORU has been fabricated and tested at JSC in both the Weightless Environment Training Facility (WETF) and the Bldg. 16 robotics labs, Price said. EVA crew timelines and robotic timelines are

being estimated and simulated, respectively, in great detail for the first time, he added.

"There is a lot of good coming out of this," Price said. "A set of close working relationships is being formed within JSC and between JSC and the robot designers at Goddard Space Flight Center and Canada. Those relationships are producing new information regarding maintenance and are creating a vital resource for further development."

The Fisher-Price team will reconvene this month to evaluate the new

information and to look at what design changes, improved maintenance techniques and tools, and robots may be effective in reducing the amount of spacewalk time needed.

When the final report is submitted in July, it will include a list of recommendations, suggested design changes and technology needs.

"I do anticipate there are going to have to be some changes in design," Fisher said. "But no one in his right mind expected the design to be frozen at this point."

Space News Roundup

The **Roundup** is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every Friday by the Public Affairs Office for all space center employees.

Swap Shop deadline is every Friday, two weeks before the desired date of publication.

Editor Kelly Humphries
Associate Editors . . Pam Alloway
Kari Fluegel

Columbia to stand aside for Atlantis

(Continued from Page 1)

Engineers are considering further tests with additional sensors at the launch pad in an effort to pinpoint the leak within the hydrogen fueling cavity, but want to be sure they can get *Columbia* off the pad by June 14 so that *Atlantis* can be rolled to the pad June 15, Crippen said.

The current schedule shows the earliest *Columbia* could be back in the VAB is June 12. Prior to that, a solid rocket booster stack that was allocated for the Spacelab Life Sciences (SLS-1) flight will be rolled atop its mobile launch platform to launch pad 39B to make room for *Columbia* in the VAB. The Lightning Protection System at the pad will help shield the partial stack, Crippen said.

Once demated in the VAB, the cavity area on *Columbia* and its external tank will be inspected for any abnormalities in the valves and seals. If possible, repairs would be made in the transfer aisle of the VAB.

Otherwise, the orbiter would be returned to the Orbiter Processing Facility for further work to ready it for another launch attempt in mid-August.

"It is our intent to make sure that these vehicles are ready and safe to fly and when we have a problem such as this—and this is the nature of the machines we are dealing with—we'll just have to fall back and regroup," Crippen said.

"We're going to encounter situations such as we have today and we're going to have to deal with them. I think we have a system that allows us to do that."

Meanwhile, preparations were under way to roll *Atlantis* to the VAB on Friday morning to be mated to its solid rocket boosters and external tank. Final weight and center of gravity tests on the orbiter were performed Thursday before placing it on the orbiter transporter.

Shuttle managers will continue to

assess the launch schedule in the wake of the decision to move *Columbia* off the launch pad, Crippen said. Among the issues they plan to discuss is whether the hydrogen leak problem will affect other orbiters, and how the manifest changes will affect planned refurbishments of *Columbia*. The oldest of the orbiters is scheduled to begin a months-long series of modifications, updates and extended duration capability additions next year. Work that may be performed during that period includes the addition of redundant nose-wheel steering and a drag chute. Whether the time available will allow those modifications to be made is yet to be determined, Crippen explained.

"We're going to have to evaluate it further in the next few weeks to understand what it does to the manifest farther in the future," he said.

Crippen said he is proud of the way the shuttle team has reacted.